

Chi-squared distribution

Determine if the statements below are true or false. For each false statement, suggest an alternative wording to make it a true statement.

1. The chi-square distribution, just like the normal distribution, has two parameters, mean and standard deviation.
2. The chi-square distribution is always right skewed, regardless of the value of the degrees of freedom parameter.
3. The chi-square statistic is always positive.
4. As the degrees of freedom increases, the shape of the chi-square distribution becomes more skewed.
5. As the degrees of freedom increases, the mean of the chi-square distribution increases.
6. When finding the p-value of a chi-square test, we always shade the tail areas in both tails.
7. As the degrees of freedom increases, the variability of the chi-square distribution decreases.

Offshore drilling

The table below summarizes a data set that examines the responses of a random sample of college graduates and non-graduates on the topic of oil drilling. Complete a chi-square test for these data to check whether there is a statistically significant difference in responses from college graduate and non-graduates.

	<i>College Grad</i>	
	Yes	No
Support	154	132
Oppose	180	126
Do not know	104	131
Total	438	389

1. State the null and alternative hypotheses.
2. Find the expected counts for all six cells under the null.
3. Compute the X^2 test statistic.
4. Check the conditions for the appropriateness of the chi-squared test. Are they met?
5. How many degrees of freedom do we have?
6. Use the following critical value to estimate the p-value and carry out the hypothesis test.

```
qchisq(p = 0.05, df = 2, lower.tail = FALSE)
```

```
[1] 5.991465
```